Chronic Obstructive Pulmonary Disease

Definition: Chronic disorders that disturb airflow, either in the airways or within lung tissue. The three disorders generally included are chronic bronchitis, emphysema, and asthma, although there are others. Patients frequently have features of more than one of these conditions. (Since the disease symptoms, course, and population affected are different for asthma, it is necessary to discuss asthma and the rest of COPD separately in some instances.) ICD-9 codes 490-496.

Summary

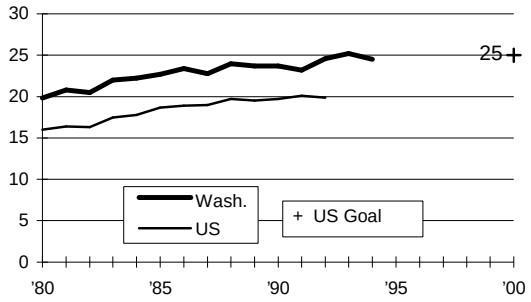
Chronic obstructive pulmonary disease (COPD) accounted for 2,116 deaths in Washington in 1992 (age-adjusted death rate, 24.7 per 100,000). It is the fourth leading cause of death in Washington and in the United States. Many of these deaths could have been prevented or delayed through reductions in cigarette smoking and in particulate air pollution. The most important strategy for reduction of COPD mortality is smoking cessation. Asthma (a component of COPD) accounted for 122 deaths in Washington in 1992 (age-adjusted death rate; 1.6 per 100,000).

Time Trends

Age-adjusted death rates for COPD have increased generally in Washington State over the past fifteen years. In 1980, the rate was 19.9 per 100,000; by 1994, it had risen to 24.6. This increase parallels an upward trend in the entire United States over this time period. It primarily reflects past patterns of cigarette smoking in the population, particularly the increased rates of smoking among women.

From 1981 to 1992, Washington state's age-adjusted mortality rate for asthma rose from 1.4 to 1.6 per 100,000; nationally, it rose from 1.0 to 1.4 per 100,000 over the same time period.

Chronic Obstructive Pulmonary Disease
Age-Adjusted Death Rates Per 100,000 Persons, with Year 2000 Goal



Year 2000 Goal

The national goal for the year 2000 is to slow the rise in COPD-related deaths to achieve an age-adjusted mortality rate of 25/100,000. There is no COPD goal for Washington.

Geographic Variation

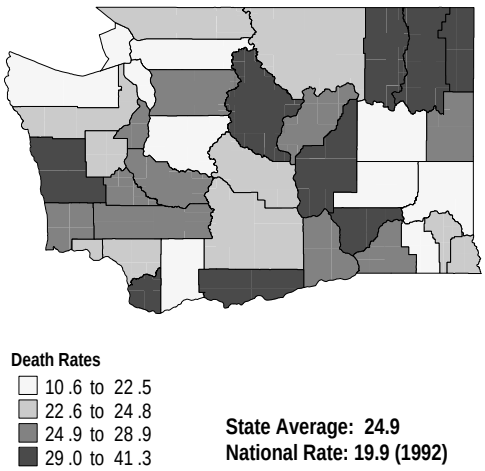
Washington's average age-adjusted COPD death rate from 1992 through 1994 was 24.9. By comparison, the national rate for 1992 (the most recent year available) was 19.9 Washington's rate has been consistently higher than the national rate since 1980. The reasons for this are unclear.

The counties with the highest average annual rates were Franklin, Pend Oreille, Klickitat, Grays Harbor, Ferry, Chelan, Stevens, Clark, and Grant. The counties with the lowest rates were San Juan, Adams, Skagit, Skamania, Clallam, Island, King, Columbia, Lincoln, and Whitman.

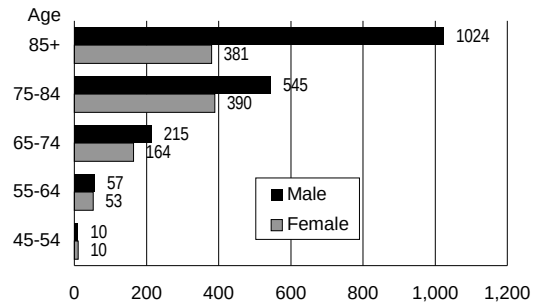
Age and Gender

COPD is primarily a disease of older adults, and mortality increases with age.

Chronic Obstructive Pulmonary Disease
Average Age-Adjusted Death Rates, 1992-1994

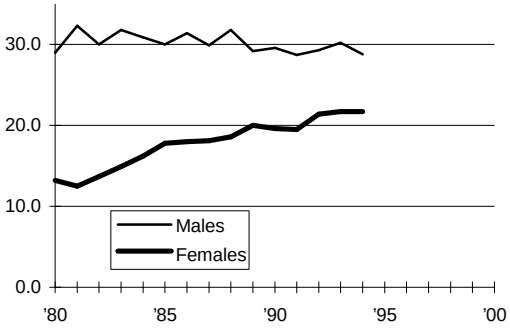


Chronic Obstructive Pulmonary Disease
by Age and Gender
Age-Specific Deaths per 100,000, Wash. State, 1994



Currently, the Washington COPD mortality rate for males is higher than that for females, especially in older age groups. However, whereas the male rate has dropped slightly since 1980, the female rate has increased dramatically. Due to the increase in smoking initiation among women in the mid-1940s, COPD-related mortality will probably continue to increase among females.

Wash. COPD Trends by Gender
Age-Adjusted Death Rates Per 100,000 Persons



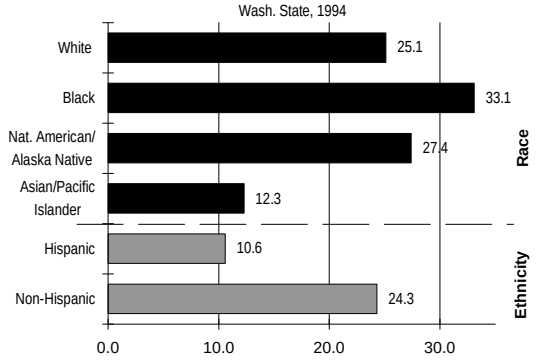
Although COPD as a whole primarily affects older adults, asthma affects children to a greater extent than adults, and asthma hospitalizations are higher for younger people. Between 1988 and 1993, the number of children in Washington hospitalized for asthma increased while overall rates of pediatric hospitalization declined. Additionally, asthma hospitalizations were higher for younger children than for older people.[1]

The prevalence of asthma is higher in boys than girls until about age 10, probably because most male infants have narrower or smaller airways and therefore may be more likely to wheeze with viral infections.[2] Mortality rates for males and females were roughly equal until 1992 when the rate for females (1.6 per 100,000) exceeded that for males (1.3 per 100,000).

Race and Ethnicity

In 1994, Blacks had the highest age-adjusted COPD death rate in Washington, followed by Native Americans and Alaska Natives.

Chronic Obstructive Pulmonary Disease
by Race and Ethnicity
Age-Adjusted Deaths per 100,000
Wash. State, 1994



Nationwide, Caucasians have a greater risk of developing COPD than African Americans. In 1992, Caucasians had an age-adjusted mortality rate of 20.3, whereas African Americans had a rate of 16.6. This may be partly attributable to racial differences in smoking behavior. While African Americans have higher smoking prevalence than Caucasians, they tend to smoke fewer cigarettes.[3] [4]

Asthma occurs in all races, but prevalence and mortality are higher in African Americans.[5] Between 1981 and 1992 in the US, the overall age-adjusted death rate for blacks rose from 2.1 to 3.4 per 100,000; in contrast, the overall age-adjusted death rate for Caucasians rose from 0.7 to 1.3 per 100,000.

Other Measures of Impact and Burden

Prevalence. Based on National Health Interview Survey results from 1980 through 1990, the age-adjusted prevalence rate for self-reported asthma in the US increased 38%, from 3100 to 4290 per 100,000 population.[6]

Hospitalization. In Washington, the rate of hospital discharge for COPD remained constant from 1990 through 1994 at 1.8 per 1,000 persons. In 1994, there were 9,598 hospitalizations with a primary diagnosis of COPD, accounting for 39,513 hospital days and direct charges of $52.5 million.

Quality of Life. In the early stages of COPD, patients appear to be symptomless and may not present to a physician until the condition is quite advanced. Because COPD does not involve sudden episodes of respiratory distress, older

individuals (who are at higher risk of developing COPD), may not become aware of the loss of pulmonary function until their ability to engage in daily activities is severely compromised.

COPD also results in increased levels of cough and sputum production, which can have physical, social, and emotional effects on patients. Research has indicated that anxiety and depression levels may increase as a result of individuals' inability to perform daily tasks.[7]

Asthma can have a major effect on affected children's emotional life and social development[8] and on the family's financial status.[9] With appropriate therapy and management a child can participate fully in most activities.

Co-outcomes. COPD is often the diagnosis when both chronic bronchitis and emphysema co-exist. In many instances chronic bronchitis precedes the development of emphysema.

Risk and Protective Factors

Tobacco Use. Smokers are 2.4 times more likely to die from COPD than non-smokers. The relative risk for COPD-related mortality varies widely depending upon type of tobacco use, gender, and inhalation patterns.[10] Former smokers are at greater risk for developing COPD than those who have never smoked,[11] but smoking cessation does reduce the risk of developing COPD and the severity of symptoms. Today's adolescents may be at higher risk of eventually developing COPD than previous generations, since smoking initiation age has been dropping. Nationally, approximately 80% of COPD mortality is attributable to smoking.

Smoking during pregnancy and parental cigarette smoking after delivery are associated with an increased risk of asthma in exposed infants.[12]

Air Pollution. There is evidence suggesting that air pollution contributes to both decreased lung function and increased mortality. [13] Even at levels lower than national or international health standards, air pollution can significantly affect the prevalence of COPD and other respiratory diseases. Some studies also suggest that when certain airborne particulates are high, COPD-related emergency room visits increase significantly [14] [15] and mortality due to COPD increases.[16]

Early and persistent exposure to allergens increases the risk of asthma development in genetically predisposed infants and children.[15] Control of suspected precipitating factors such as environmental tobacco smoke, dust, mites, pollen and animal, insect and mold allergens can help prevent asthma in these children.

Occupational exposures. Occupational exposures to both organic particles created in grain processing and animal feed industries, and inorganic particles (e.g. silicates) created through mining have been found to significantly affect loss of lung function, and evidence exists that years of exposure is a significant factor in lung function decline.[16] Evidence also suggests that smoking and occupational exposures have an additive affect on the risk for developing COPD.[17]

High Risk Groups

The poor. Low income, lack of education, and other indicators of low socioeconomic status have been shown to be associated with higher COPD mortality.[18] This may be related to both poor access to medical care services and high rates of modifiable risk factors such as tobacco use and exposure to airborne pollutants.

The elderly. COPD is primarily a disease of older adults.

Pollutant-exposed workers. Those in occupations exposed to a significant amount of organic or inorganic airborne particulate are at higher risk for developing COPD and COPD-related mortality.[19]

Intervention Points, Strategies and Effectiveness

Since smoking is the major risk factor for developing and dying from COPD, interventions aimed at smoking cessation programs will have the greatest impact on COPD mortality. Smoking cessation programs have been implemented in a variety of settings, with varying success rates. Because of the long latency period during which COPD develops, smoking cessation does not eliminate the risk of developing COPD, which is dependent upon the length of the smoking habit and its severity. Recent studies have shown that, regardless of age, smoking cessation can help slow the rate of decline in pulmonary function.

In persons with existing COPD, control of risk factors slows the progression of the disease. Symptoms of the disease can further be controlled with the use of medications. Once COPD has been

diagnosed, medical intervention such as the use of bronchodilators and anticholinergics, as well as smoking cessation or reduction may be helpful in alleviating symptoms, reducing pulmonary function decline, and improving overall quality of life.

Risks associated with living or working in polluted areas can be reduced through health standards in the workplace and use of safety gear such as face masks by employees. Both nationally and in Washington, standards for different types of pollutants have been established. In Washington there has been a downward trend in air pollution. Because particulate pollution can aggravate existing COPD, this decline is important in reducing the severity of existing disease and mortality.

Primary asthma prevention strategies include interventions that encourage women to avoid smoking during pregnancy and restrict exposure of infants and children to environmental tobacco smoke. Control of risk factors includes education to reduce the exposure of infants, children, and asthmatics to indoor allergens[20]; use of plastic mattress cover; removal of carpets/rugs from sleeping area; keeping pets out of the child's bedroom and frequently washing stuffed animals.

Data Sources

State death data: Washington Department of Health, Center for Health Statistics.

National death data: Center for Disease Control and National Center for Health Statistics.

Washington hospitalization Data from the Comprehensive Hospital Abstract Reporting System (CHARS)

Technical Notes

All relative risks reported are for mortality.

Endnotes:

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[5] Asthma--United States, 1980-1990. (1992) MMWR 41(39); 733-735

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[15] Morgan WJ & Martinez FD (December 1992): Risk factors for developing wheezing and asthma in childhood. In DA Stempel & SJ Szefler (Eds). Asthma Pediatric Clinics in North America, 39,1225-1241.

[16] Oxman AD et. al.: Occupational Dust Exposure and Chronic Obstructive Pulmonary Disease: A Systematic Overview of the Evidence American Review of Respiratory Disease 1993;148:38-48.

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[18] Ibid

[19] Hnizdo E. Health risks among white South African goldminers--dust, smoking and chronic obstructive pulmonary disease. South African Med J. 1992;81: 512-16

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